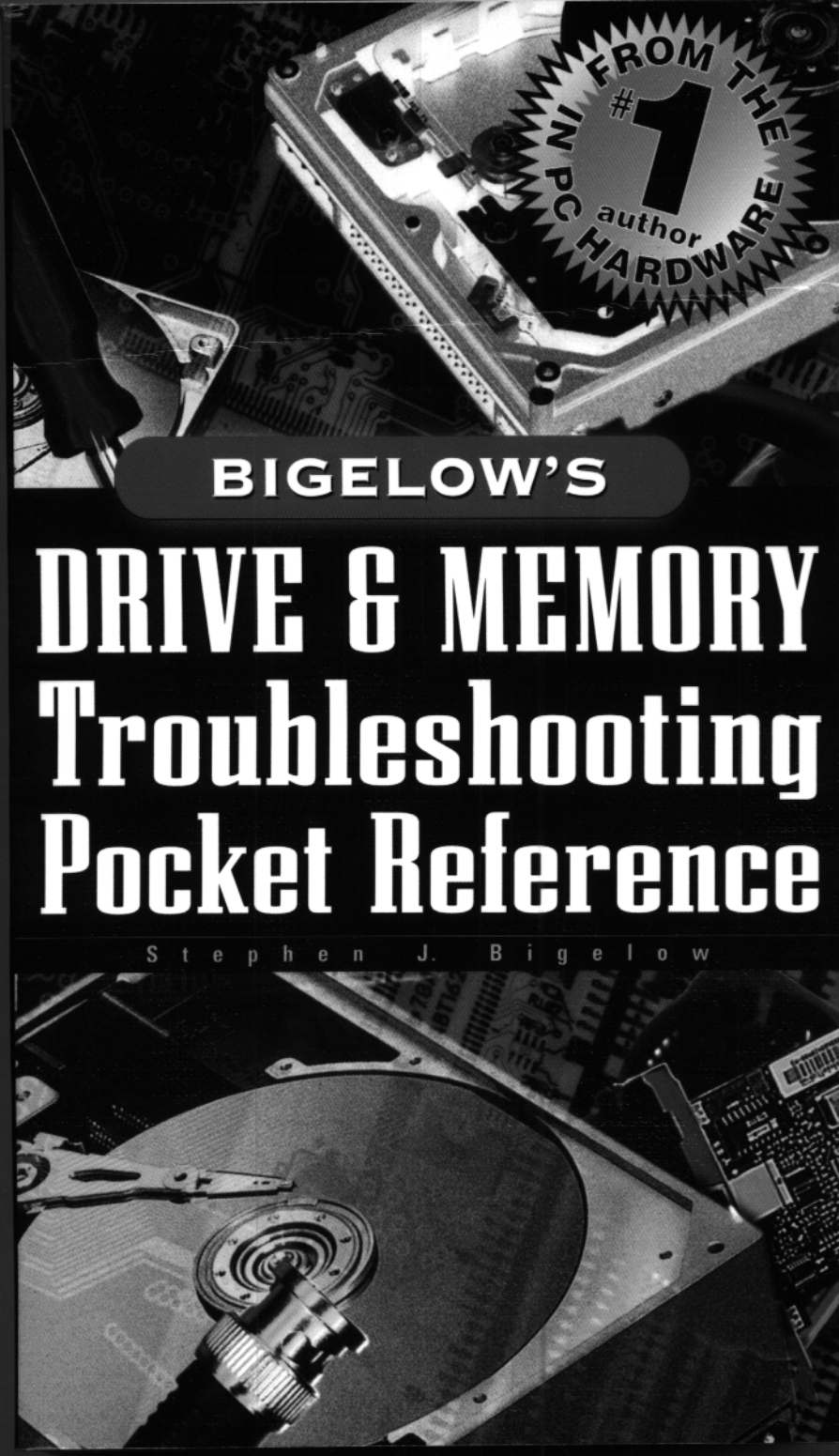

BIGELOW'S

DRIVE & MEMORY Troubleshooting Pocket Reference

Stephen J. Bigelow

The complete guide for diagnosing and solving PC drive and memory problems

If you're in need of answers when a malfunction occurs in your PC's storage system, then look no further than *Bigelow's Drive and Memory Troubleshooting Pocket Reference*. Inside this handy reference you'll find information about the newest memory technologies along with helpful tips and techniques for selecting, installing, optimizing, and troubleshooting which are applicable to all PC computer systems.

Written by best-selling author and computer professional, Stephen Bigelow, the book is filled with the practical advice you've come to expect to quickly solve PC problems. It provides all the know-how needed to:

- Understand, select, install, and troubleshoot PC memory
- Install hard drives of any size into almost any system without losing data
- Maintain peak hard drive performance
- Optimize your CD-ROM, CD-R, and CD-RW drive performance
- Master DVD-ROM drive installation and troubleshooting
- Keep your tape drives running reliably
- Overcome PC card conflicts and problems

Packed with step-by-step troubleshooting procedures, this is the most accessible one-stop guide available for PC techs, end users, and enthusiasts alike!

Series Design: Tisa Lynn Lerner Photomontage: Eric Yang

Computing
McGraw Hill
REQUIRED READING for the Information Age
A Division of The McGraw-Hill Companies

$19.99 USA

www.osborne.com

HARDWARE

ISBN 0-07-135453-0

90000

Contents

List of Symptoms xiii

Section 1. Memory Modules 1

Memory Types 2
BEDO (Burst Extended Data Output RAM) 2
CDRAM (Cached DRAM) 2
DDR SDRAM (Double Data Rate SDRAM) 2
DRAM (Dynamic Random-Access Memory) 3
EDO RAM (Extended Data Out RAM) 4
EDRAM (Enhanced DRAM) 4
FPM DRAM (Fast-Page-Mode DRAM) 5
PC100 SDRAM 5
RDRAM (Rambus DRAM) 6
SDRAM (Synchronous or Synchronized DRAM) 7
SRAM (Static Random-Access Memory) 7
VRAM (Video Random-Access Memory) 8
WRAM (Windows RAM) 9
Memory Characteristics 9
Memory speed and wait states 10
Determining memory speed 11
Megabytes and memory layout 12
Presence detect (PD) 14
Understanding memory refresh 14
Memory techniques 20
Composite vs. noncomposite 22
Parity and Error Correction 23
The parity principle 23

Even vs. odd 23
The problems with parity 24
Circumventing parity 24
Abuse and detection of fake-parity memory 25
Alternative error correction 27
Memory Organization 28
Conventional memory 28
Extended memory 30
Expanded memory 31
Upper memory area 32
High memory 33
Selecting and Installing Memory in PCs 33
Getting the right amount 34
Filling banks 35
Bank requirements 35
Selecting and Completing BIOS Upgrades 37
Recognizing BIOS problems 40
Gathering information 44
Determining BIOS IC type 45
Updating a flash BIOS 46
Memory Troubleshooting 48
Repairing SIMM/DIMM sockets 49
Contact corrosion 50
Parity errors 50
Traditional AT memory errors 51
Contemporary memory symptoms 52
BIOS upgrade troubleshooting 60
Windows-related memory errors 65
Web Contacts 79

Section 2. Floppy Drives 81

Floppy Drive Layout and Characteristics 81
Drive sensors and electronics 83
Physical interface 86
Floppy Drive Installation and Replacement 89
Typical installation 90
Reversing floppy drive assignments 95
Floppy Drive Troubleshooting 97
Floppy troubleshooting guidelines under Windows 95/98 97
Symptoms 100
Web Contacts 113

Section 3. LS-120 Drives 115

LS-120 Drive Layout and Characteristics 115
Diskette compatibility and cleaning 116
LS-120 Drive Installation and Replacement 117
Typical installation 119
Driver installation 122
LS-120 Considerations and Issues 125
Booting and system BIOS 125
Booting and operating systems 126
Compatibility with system manufacturers 126
Compatibility with system utilities 127
LS-120 device conflicts 127
Drive overlay software 128
Driver support under Windows 95A 129
LS-120 Troubleshooting 129
Web Contacts 140

Section 4. Iomega Zip Drives 141

Zip Drive Installation and Replacement 142
Parallel port 142
USB port 143
ATAPI IDE port 144
Getting the most from your Zip drive 148
Zip disk guidelines 150
Zip Drive Software Considerations and Testing 151
Obtaining updated Zip software 152
Manually installing Zip parallel-port drivers 152
Uninstalling Zip software 154
Changing the Zip drive letter 154
Formatting Zip disks with Iomega software 155
Formatting Zip disks with Windows 95/98 FORMAT 155
Formatting Zip disks with DOS 155
Protecting Zip disks 156
Zip drive troubleshooting 156
Web Contacts 193

Section 5. Hard Drives 195

IDE/EIDE Hard Drive Concepts 196
Binary megabytes vs. decimal megabytes 196
IDE/ATA 197

ATAPI 198
ATA-2, Fast-ATA, and EIDE 198
ATA-3 199
Ultra-ATA/33 199
Ultra-ATA/66 200
Common UDMA/66 issues 200
Data transfer rates 201
Block mode transfers 203
Ideas of bus mastering 204
Concepts of Drive Formatting 207
Low-level formatting 208
Partitioning 210
High-level (DOS) formatting 211
File Systems and Tips 212
FAT basics 212
FAT16 213
Positioning a large hard drive with FAT 16 FDISK 214
Partitioning large hard drives 214
FAT32 216
Partitioning and formatting for FAT32 217
Using the FAT32 drive converter 220
Creating a FAT32 Startup Disk for Windows 98 221
Understanding the master boot record 222
Understanding Drive Capacity Limits 224
Cylinder limits in BIOS 225
Partition limits in the operating system 225
Overcoming capacity limits 226
Hard Drive Installation/Replacement Guidelines 229
Select jumper configurations 229
Attach cables and mount the drive 230
Configure the CMOS Setup 231
Finish the drive preparation 232
Reassemble the computer 232
Drive Testing and Troubleshooting 232
General troubleshooting guidelines 233
Potential problems with Y splitters 234
Potential problems with bus speeds beyond 66 MHz 235
Troubleshooting DOS compatibility-mode problems 236
Detecting a DDO 240
Removing a DDO 241
Hardware symptoms 242
File system symptoms 263
Software-oriented symptoms 267

FAT32 symptoms 279
Web Contacts 290

Section 6. CD-ROM Drives 293

Understanding CD Media 294
CD data 294
Caring for compact disks 296
CD-ROM/CD-R Standards and Characteristics 297
High Sierra 298
ISO 9660 298
CD-ROM/CD-R standards ("books") 299
The multispin drive 300
The MPC 301
Effects of CD-ROM caching 301
Bootable CD-ROM (El Torito) 303
CD-ROM Installation and Replacement 304
Select jumper configurations 304
Attach cables and mount the drive 305
Configure the CMOS Setup 306
Reassemble the computer 306
Install the software 306
Understanding the Software 307
Device drivers 307
MSCDEX.EXE 308
Troubleshooting CD-ROM Drives 310
General symptoms 311
Windows-related symptoms 326
Web Contacts 345

Section 7. CD-R Drives 347

Understanding CD-R Concepts 347
"Orange Book certified" media 348
Multisession CDs 348
Fixation vs. finalization 349
Disk-at-Once 349
Track-at-Once 350
Incremental and packet writing 350
Caring for recordable CDs 350
CD-R Installation and Replacement 351
Select jumper configurations 352
Attach cables and mount the drive 352
Configure the CMOS Setup 353

Reassemble the computer 354
Install the software 354
Understanding the Software 355
Device drivers 355
MSCDEX.EXE 356
Upgrading CD-R firmware 358
Troubleshooting CD-R drives 359
CD recording issues 359
Typical compatibility problems 362
Typical multisession CD issues 364
Buffer underruns 365
General CD-R symptoms 370
Web Contacts 385

Section 8. CD-RW Drives 387

Understanding CD-RW Concepts 388
Working with UDF 389
Disk capacity under UDF 389
UDF and disk compatibility 389
Multi-Read CD-ROM drives 390
UDF readers 391
UDF reader compliance 391
UDF and audio CDs 392
Windows 98 and UDF 392
Using DirectCD 392
Preparing a data CD 393
Writing data to a DirectCD disk 394
Ejecting a DirectCD disk 394
Erasing a DirectCD disk 394
Fixing an unreadable disk 395
Caring for rewritable CDs 395
CD-RW Installation and Replacement 397
Select jumper configurations 397
Attach cables and mount the drive 398
Configuring the CMOS Setup 399
Reassemble the computer 400
Install the software 400
Upgrading CD-RW firmware 400
Troubleshooting CD-RW Drives 401
Troubleshooting tips 402
General symptoms 402
Web Contacts 413

Section 9. DVD-ROM Drives 415

The Potential of DVD 415
Specifications and Standards 417
Access time 417
Data transfer rates 418
Books and standards 418
Data formats 419
Audio and video standards 419
Region code control 420
CD compatibility 421
Caring for a DVD disk 421
The MPEG-2 Decoder Board 422
A look at MPEG-2 423
Notes on Dolby AC-3 423
Decoder board connections 424
Software DVD decoders 425
DVD-ROM installation and replacement 426
Select jumper configurations 427
Attach cables and mount the drive 427
Install the decoder card 428
Configuring the CMOS Setup 429
Reassemble the computer 429
Install the software 429
Upgrading DVD-ROM firmware 430
Troubleshooting DVD-ROM drives 431
Initial setup and tips 431
DVD software and Windows 98 432
Installation and startup symptoms 434
Performance/operating symptoms 443
Windows-related symptoms 452
Web Contacts 459

Section 10. Removable Media Drives 461

General Drive Installation and Replacement 462
Select jumper configurations 462
Preinstall any software 463
Attach cables and mount the drive 463
Configure the CMOS Setup 464
Reassemble the computer 464
Install the software 465
Iomega Bernoulli and Jaz Drives 465

Read/write-protecting Jaz disks 466
Unprotecting the Jaz software disk 467
Removing Iomega Tools from the Startup group 468
Uninstalling Jaz Tools software 468
Bernoulli drive troubleshooting 469
Jaz/Bernoulli adapter troubleshooting 474
Jaz drive troubleshooting 481
SyQuest EZ-Flyer and SyJet Drives 498
Ejecting a "powered" SyQuest cartridge 498
Ejecting an "unpowered" SyQuest cartridge 499
SyQuest drive and cartridge tips 499
General SyQuest drive tips 500
SyQuest drive troubleshooting 502
Web Contacts 521

Index 523